2007 Update of Breast Cancer Tumor Markers Clinical Practice Guideline: Recommended Tumor Markers

HER2

- Not recommended for prognosis with early stage breast cancer

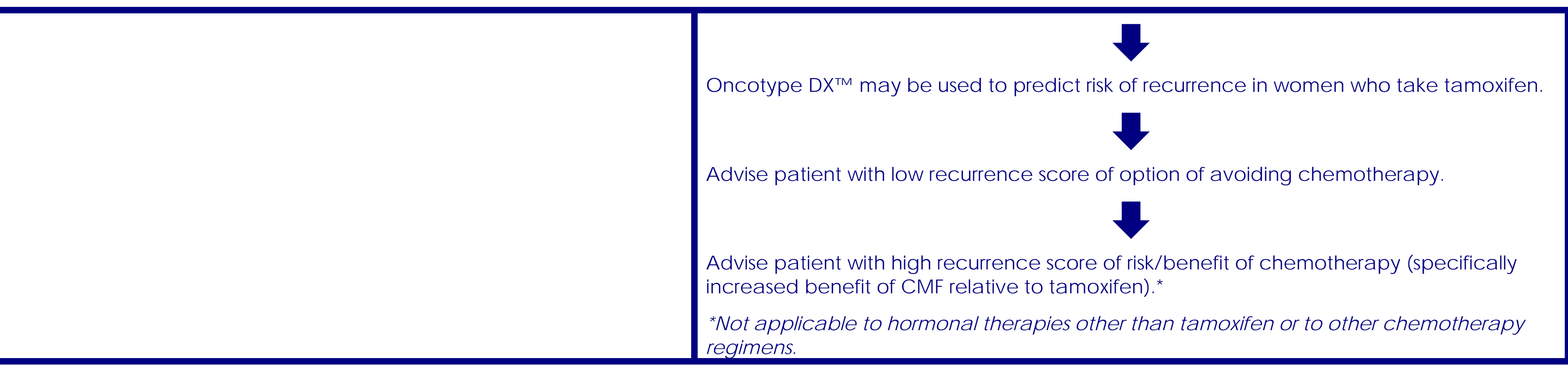
Screening	Diagnosis	Treatment Planning
Not recommended	With primary invasive cancers, evaluate at diagnosis or recurrence or metastatic diagnosis.	HER2 should not be used to withhold endocrine therapy for a patient with hormone-receptor positive breast cancer, nor should it be used to select one specific type of endocrine therapy over another.
	Order IHC or FISH to evaluate level of HER2 expression or amplification.* →	If high levels of overexpression (IHC +3 or FISH ratio by gene amplification>2.0), recommend trastuzumab.
	**See ASCO guideline on HER2 testing at www.asco.org/guidelines/her2*	If considering chemotherapy when HER2 is positive and not planning trastuzumab, an anthracycline is recommended (absent contraindications).

Primary Invasive – ER/PgR

Screening	Diagnosis
Not recommended	Measure on primary invasive breast cancer. May be measured on metastatic breast cancer.
	Use ER and PgR status to identify if patient likely to benefit from endocrine therapy.

Multiparameter Gene Expression Analyses

Screening	Prognosis/Treatment Planning
Not recommended	Use in node-negative, ER positive women.



Oncotype DX™ may be used to predict risk of recurrence in women who take tamoxifen.

Advise patient with low recurrence score of option of avoiding chemotherapy.

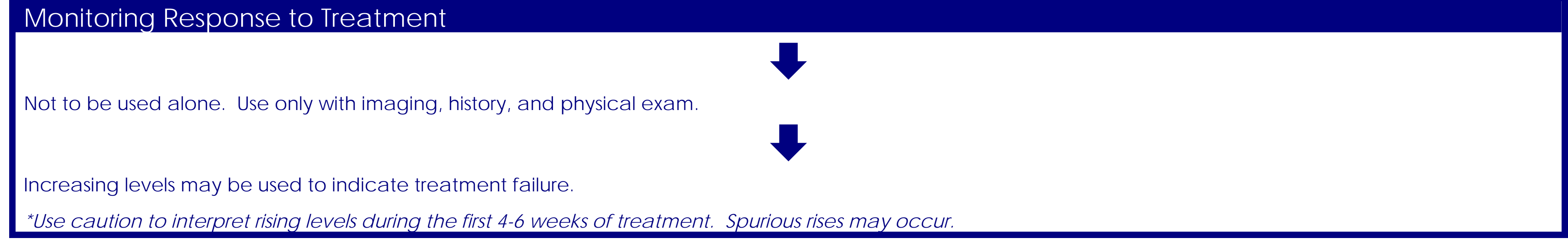
Advise patient with high recurrence score of risk/benefit of chemotherapy (specifically increased benefit of CMF relative to tamoxifen).*

**Not applicable to hormonal therapies other than tamoxifen or to other chemotherapy regimens.*

uPA and PAI-1

Screening	Prognosis
Not recommended	Use with women with newly diagnosed, node negative breast cancer. ↓ Measure by ELISA on a minimum of 300 mg of fresh or frozen breast cancer tissue. ↓ Advise patient (especially those with hormone receptor positive tumors) that low levels are associated with low risk of recurrence and chemotherapy of minimal added benefit. ↓ Consider using CMF-based adjuvant chemotherapy with patients with high risk of recurrence indicated by high levels of these uPA and PAI-1.

CA 15-3 and 27.29 for metastatic breast cancer



Monitoring Response to Treatment

Not to be used alone. Use only with imaging, history, and physical exam.

Increasing levels may be used to indicate treatment failure.

**Use caution to interpret rising levels during the first 4-6 weeks of treatment. Spurious rises may occur.*

CEA for metastatic breast cancer

Monitoring Response to Treatment

Not to be used alone. Use only with imaging, history, and physical exam.

Increasing levels may be used to indicate treatment failure.

**Use caution to interpret rising levels during the first 4-6 weeks of treatment. Spurious rises may occur.*

Summary: Tumor Markers Reviewed in 2007 Breast Cancer Tumor Markers Update

Breast Cancer Tumor Markers	Not Recommended	Recommended
CA 15-3, CA 27.29	Screening, diagnosis, staging, prognosis, or surveillance. Using alone for monitoring.	Monitoring for patients with metastatic disease during active therapy in conjunction with imaging, history, and physical exam.
CEA	Screening, diagnosis, staging, prognosis, or surveillance. Using alone for monitoring.	Monitoring for patients with metastatic disease during active therapy in conjunction with imaging, history, and physical exam.
ER, PgR	Screening, staging, prognosis, surveillance, or monitoring. For women with DCIS who are candidates for hormonal therapy.	For diagnosis, treatment planning – on every primary invasive breast cancer and on metastatic lesions if would influence treatment planning.
DNA Flow Cytometry-Based Proliferation Markers	Screening, diagnosis, staging, prognosis, surveillance, or monitoring.	No
Immunohistochemically-based markers of proliferation	Screening, diagnosis, staging, prognosis, surveillance, or monitoring	No
HER2	Screening, staging, prognosis, surveillance or monitoring. To withhold or select one specific type of endocrine treatment. To guide use of adjuvant taxane treatment.	Predict response to trastuzumab and to anthracycline-based therapies in the adjuvant setting or metastatic setting.
Circulating Extracellular Domain of HER2	Screening, diagnosis, staging, prognosis, surveillance, or monitoring.	No
p53	Screening, diagnosis, staging, prognosis, surveillance, or monitoring.	No
Cathepsin D	Screening, diagnosis, staging, prognosis, surveillance, or monitoring.	No
uPA and PAI-1	Screening, diagnosis, staging, surveillance, or monitoring.	To determine prognosis, guiding use of CMF-based adjuvant chemotherapy.
Cyclin E	Screening, diagnosis, staging, prognosis, surveillance, or monitoring.	No
Proteomic Analysis	Screening, diagnosis, staging, prognosis, surveillance, or monitoring.	No
Multiparameter Gene Expression Analysis	Screening, diagnosis, staging, surveillance, or monitoring. Prediction for hormonal therapies other than tamoxifen or other chemotherapy regimens.	Onco*type*DX™ to determine prognosis for women with node negative, ER positive breast cancer who will receive adjuvant tamoxifen. Guiding use of adjuvant tamoxifen and adjuvant chemotherapy (specifically CMF).
Multiparameter Gene Expression Analysis, other	Screening, diagnosis, staging, prognosis, surveillance, or monitoring.	No
Bone Marrow Micrometastases	Screening, diagnosis, staging, prognosis, surveillance, or monitoring.	No
Circulating tumor cell assays	Screening, diagnosis, staging, prognosis, surveillance, predicting, or monitoring.	No

These tables are derived from recommendations in the 2007 Update of Recommendations for the Use of Tumor Markers in Breast Cancer. This table is a practice tool based on ASCO® practice guidelines and is not intended to substitute for the independent professional judgment of the treating physician. Practice guidelines do not account for individual variation among patients. This tool does not purport to suggest any particular course of medical treatment. Use of the practice guidelines and this table are voluntary. The practice guideline and additional information is available at http://www.asco.org/guidelines/breasttm. Copyright © 2007 by the American Society of Clinical Oncology. All rights reserved.